

ARCADIS Varic

SP

Maintenance Instructions

System

Maintenance Instructions

These maintenance instructions include
maintenance protocol SPR2-310.832.01.02.01

The protocol SPR2-310.832.01.02.02 is required for
these instructions

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1 General

1.1 Requirements

The requirements described in chapter 1 of the Service Instructions also apply to maintenance.

1.2 Required documents

- Safety information according to ARTD, part 2
- Maintenance protocol SPR2-135.832.01..
- Main system adjustment instructions SPR2-310.842.01..
- Spare parts list
- Replacement of parts: SPR2-310.841.01.01.02

1.2.1 When laser light localizer is present

- Setting Instructions RXR2-130.032.01

1.2.2 When I.I. laser light localizer is present

- Installation and Setting Instructions RXR2-130.033.03..

1.3 Required tools, test equipment and aids

NOTE

All tools, measuring equipment and aids, with the exception of those including a “*”, are listed and specified in ARTD (part 3).

- | | | |
|---|----------------------------|-----------------|
| • Tool case* | | |
| • 1 set of Allen wrenches* | | |
| • Spring balance up to 200N | | 44 15 113 RH090 |
| • Equivalent leakage current measuring unit, | e.g., Bender safety tester | 97 06 979 Y0526 |
| • Ground wire tester | | 44 15 899 RV090 |
| • DVM Fluke 8060A | | 97 02 101 Y4290 |
| • Dosimeter, | e.g., PTW Diados | 97 17 612 Y0388 |
| • Dynamic test case | | 37 90 156 X1963 |
| • Precision radiation filter | | 99 00 598 XE999 |
| • Set of resolution tests | | 28 71 820 RE999 |
| • Set of radiation filters | | 97 98 596 G5321 |
| • Centering cross (only with diamentor) | | 96 60 051 RE999 |
| • SMfit Spotmeter | | 77 52 848 |
| • Sealant | | 34 43 009 |
| • Line impedance tester | | 84 28 104 Y4337 |
| • Special oil (Optimol GmbH- Viscogen KL300, 40g) | | 73 95 353 RH090 |

1.4 Potentially required spare parts

- Cable deflectors steering castor large/ARCADIS Varic stand
- Cable deflectors steering castor small/ARCADIS Varic stand
- Paint stick
- Paint spray can

1.5 Emphasized texts




 DANGER	DANGER indicates when there is an immediate danger that l e a d s to death or serious physical injury.
 WARNING	WARNING indicates a risk of danger that m a y l e a d to death or serious physical injury.
 CAUTION	CAUTION used with the safety alert symbol indicates a risk of danger that leads to slight or moderate physical injury and/ or damage to property.
NOTICE	NOTICE used without the safety alert symbol indicates a risk of danger that if disregarded leads or may lead to a potential situation which may result in an undesirable result or state other than death, physical injury or property damage.

Fig. 1: Safety Notes

1.6 Safety information and preventive measures

NOTICE

The following instructions must be observed!

- ⇒ When performing service work and tests, you must adhere to:
- ⇒ - The product-specific safety information in the documentation, safety information TD00-000.860.01.03.01,
- ⇒ - As well as the general safety information contained in ARTD, part 2.
- ⇒ Pull out the power plug when working on the ARCADIS Varic.
- ⇒ Ensure compliance with general safety requirements when working with the system under power.
- ⇒ Observe ESD guidelines!
- ⇒ Switch off the ARCADIS Varic before replacing modules or boards.
- ⇒ After all work has been completed and all cover panels have been installed, perform the ground wire measurement according to ARTD-002.731.17.
- ⇒ The protective conductor resistance may not exceed 0.2 ohms.
- ⇒ When performing service work on the power-on module, (replacing the power-on module or replacing the power cable) the equivalent leakage current must be measured and recorded.

1.7 Explanation of abbreviations

Abbrev.	Explanation
SI	Safety inspection
SIE	Electrical safety inspection
SIM	Mechanical safety inspection
PM	Preventive maintenance
PMP	Periodic preventive maintenance
PMA	Preventive maintenance adjustments
PMF	Preventive check of the operating values and functions
Q	Quality quality, image quality
QIQ	Image quality
QSQ	System quality check
SW	Software maintenance

The steps identified by these abbreviations are listed as checkpoints in the Maintenance Protocol and must be checked off there accordingly.

NOTE

The sequence for the complete inspection and maintenance is found on the following pages.

Each step must be performed annually, unless otherwise specified.

1.8 Maintenance interval

12 months

36 months

UPS (Uninterrupted Power Supply)

- The lead-acid batteries of the UPS in the monitor cart are to be exchanged every 36 months.

2 Visual and electrical inspection

2.1 Visual inspection

PMP Damage

Check the entire system for damage, such as housing or paint damage.

2.2 Electrical inspection

2.2.1 Outlets

SIE **Damage**

SIE **Line voltage**

SIE **Internal line impedance**

- Check outlets used to operate the system for damage.
- Measure the line voltage and compare it to the line voltage label on the monitor cart.
- Measure the internal line impedance

3 Safety inspection

3.1 Mechanical safety inspection

SIM Cover panels

- Remove the cover panels from the ARCADIS Varic stand and the monitor cart.
- Check the cover panels for mechanical damage.

SIM Cable deflectors

- Check the cable deflectors at the stand and monitor cart and replace them if necessary.

SIM I.I. laser light localizer mechanics (if available)

- Check the I.I. laser light localizer for mechanical damage.
- Mount the I.I. laser light localizer on the I.I. and ensure proper locking and seating. When doing this, pay special attention to the tension band and its closure.
- Check the I.I. ring for damage.

SIM I.I. laser light localizer function (if available)

- Perform maintenance on the I.I. laser light localizer according to Installation and Setting Instructions RXR2-120.033.03...

SIM Laser light localizer mechanics (if available)

- Check the I.I. attachment of the laser light localizer for mechanical damage.
- Mount the I.I. attachment of the laser light localizer on the I.I. and ensure proper locking and seating.
- Check the I.I. ring for damage.

SIM Laser light localizer function (if available)

- Perform maintenance on the laser light localizer according to Setting Instructions RXR2-130.032.01...

SIM Foot brake

- Check the braking effect of the foot brakes of the ARCADIS Varic stand and monitor cart on a flat surface.

SIM Brakes

- Use the spring balance to check whether the orbital brake, angulation brake, swivel brake, horizontal lift brake, and vertical lift brake reach the defined braking values in the braked state (Replacement of Parts Instructions for ARCADIS Varic).

SIM C-arm

- Perform all C-arm movements while paying attention to the bearing play and bearing noises.

SIM Wheels

- Move ARCADIS Varic on a flat surface.
- Evaluate the straight and quiet movement of the ARCADIS Varic.
- Replace damaged wheels.

SIM Lifting column

NOTE

There may not be any additional weight on the C-Arm for these checks and adjustments, e.g. lead aprons or other cover panels.

- Switch the system on.
- Electrically move the lifting column over its entire lift range.
 - While doing this, listen for movement noises and bearing play.
 - The lifting column must automatically shut off at the final positions.
 - In the case of the ARCADIS Varic, a stop signal sounds when moving backward and the lifting column does not move. A signal sounds when the backward button is again operated.
 - When the direction buttons are pressed at the same time, the lifting column must remain in position.
- Operate the emergency stop button.
 - The motorized vertical lift is blocked.
- Unlock the emergency stop button by pressing it lightly and turning to the left.
- Switch the system off.
- Oil the lifting column.
 - Move the lifting column approx. 50 cm in an upward direction for this purpose.
 - Remove the now visible plastic cap.
 - Fill approx. 2 cm³ of special oil into the visible tunnel.

SIM Cassette holder (if present)

- Check cassette holder for mechanical damage.
- Mount the cassette holder on the I.I. and ensure proper locking and seating.

SIM Warning signs

- Check the completeness and condition of the warning signs.
 - If they are no longer legible, replace them.

SIM ID labels

- Check the completeness and condition of the ID labels.
 - If they are no longer legible, replace them.

SIM TFT monitor(s)

- Check monitor(s) for damage.
- Check monitor(s) for proper attachment to the monitor cart.
- Check additional monitors for damage and proper attachment to the wall support/monitor support system (if applicable).

3.2 Electrical safety inspection

SIE Cables and plugs

- Check visible system cables and plugs for damage.

SIE Fluoroscopic timer

- Check: See compulsory radiation shut off.

SIE Acoustic warning signal

- Check: See compulsory radiation shut off.

SIE Compulsory radiation shut off



- Switch the system on.
- Check the functioning of the acoustic warning signal and the compulsory radiation shut off in accordance with the country regulations (if required). Also check the functioning of the fluoroscopic timer in this process.

NOTE

The acoustic warning signal must sound every 4, 5.5, or 9.5 minutes of the fluoroscopic time depending on the programming. It sounds again every 5 or 10 minutes. It is turned off by pressing the -0- button once. Pressing this button again resets the fluoroscopic timer to "0". Depending on the country-specific programming, either the required radiation shut off does not occur or it occurs every 5 or 10 minutes and then every 5 or 10 minutes after that.

SIE Check the radiation release switch



- Check the functioning of the hand and foot switches for radiation release.
- check the cables of the radiation release switches for mechanical damage.
- Check the cables for cable breakage via movement.

SIE Radiation indicator



- Activate fluoroscopy briefly.
 - ⇒ The radiation indicator on the operating part of the ARCADIS Varic stand and the radiation indicator on the monitor cart must light.
- Switch the system off.

SIE Iris collimator



- Check the iris collimator and correct it if necessary.
 - Select I.I. full format and activate fluoroscopy briefly.
 - The collimator plates must be clearly visible at the image edge.
 - Select zoom format and activate fluoroscopy briefly.
 - The collimator plates must be slightly visible at the image edge.

SIE Conductive rubber

- Check conductive rubber on the ARCADIS Varic stand and the wheels of the monitor cart for damage or contamination, and replace or clean them as necessary.

SIE Ground wire test

- Test the ground wire with the ground wire tester according to ARTD-002.731.17.

NOTE

The equivalent leakage current is to be measured and documented using the equivalent leakage current tester according to ARTD-002.731.17 in the scope of validity of DIN VDE 0751. See the subsequent work steps.

SIE Equivalent leakage current

The equivalent leakage current is to be measured and documented using the equivalent leakage current tester according to ARTD-002.731.17 in the scope of validity of DIN VDE 0751.

NOTE

The instructions according to ARTD-002.731.17 are to be adhered to outside the scope of validity of DIN VDE 0751.

4 Maintenance, operating value, and functional inspection

4.1 Maintenance

PMP Cleaning the system

- Clean the entire system:
 - Visible cables
 - Outside surfaces
 - Running surfaces of the wheels
 - Interior space

PMP System ventilation

- Clean the ventilation slots of the ARCADIS Varic stand and monitor cart.

4.2 Operating value inspection



Dose rate

- Switch the system on.
- Check the dose rate (see the ARCADIS Varic service instructions for this purpose).

PMF

Event log

- Read out and evaluate the system event log.

4.3 Functional inspection

SIE TFT monitor

- Check the TFT monitor with the image quality assurance test.

SIE Cassette exposure collimation (if present)



- Check cassette exposure collimation.
 - Attach the cassette holder with the cassette and film to the I.I.
 - The iris diaphragm opens fully when the cassette is inserted.
 - The mA display switches to mAs in the exposure data field and the operation indicator switches off.
 - Initiate an exposure with 40 kV and 5 mAs and develop the film. The diaphragm plates should be visualized parallel to the film edges, be visible at all four edges of the film, and appear at the film edge.
 - Pressing the iris diaphragm buttons simultaneously causes the iris diaphragm to open to the dimensions previously set during fluoroscopy.
- Correction:
 - See the Main System Adjustment Instructions, "Setting the cassette exposure collimation".

SIE Area dose product measuring unit (if present)

- Check the area dose product measuring unit and the calibration. (See the Main System Adjustment Instructions SPR2-310.842.01...).

PMF Laser camera connection (if present)

- Check the functioning of the laser camera connection.

PMF Check the operating function.

- Check all system operating functions.

PMF Monitor display of the iris collimator opening



- Select I.I. full format.
- Completely close the iris collimator (X-iris).
- Mark the diameter of the collimated iris collimator opening on the monitor.
- Switch fluoroscopy on briefly. The actual diameter of the iris collimator is visible. The previously displayed monitor display must match the position and diameter of the actual iris collimator opening.
- Completely open the iris collimator.



- Mark the diameter of the collimated iris collimator opening on the monitor.
- Switch fluoroscopy on briefly. The actual diameter of the iris collimator is visible. The previously displayed monitor display must match the position and diameter of the actual iris collimator opening.
- Select I.I. zoom format.
- Completely close the iris collimator (X-iris).
- Mark the diameter of the collimated iris collimator opening on the monitor.

Maintenance, operating value, and functional inspection



- Switch fluoroscopy on briefly.

The actual diameter of the iris collimator is visible. The previously displayed monitor display must match the position and diameter of the actual iris collimator opening.

- Completely open the iris collimator.



- Mark the diameter of the collimated iris collimator opening on the monitor.
- Switch fluoroscopy on briefly.

The actual diameter of the iris collimator is visible. The previously displayed monitor display must match the position and diameter of the actual iris collimator opening.

PMF PMF monitor display of the slot diaphragm positions.

- Select I.I. full format.
- Completely close the slot diaphragm and rotate the slot diaphragm from the basic position.

- Mark the distance and angle of rotation of the displayed slot diaphragm position on the monitor.



- Switch fluoroscopy on briefly.

The actual position (distance of the plates and angle of rotation) of the slot diaphragm is visible. The previously displayed monitor display must match the position and angle of rotation of the actual slot diaphragm position.

- Completely open the slot diaphragm and rotate the slot diaphragm again.
- Mark the distance and angle of rotation of the displayed slot diaphragm position on the monitor.



- Switch fluoroscopy on briefly.

The actual position (distance of the plates and angle of rotation) of the slot diaphragm is visible. The previously displayed monitor display must match the position and angle of rotation of the actual slot diaphragm position.

- Select I.I. zoom format.
- Completely close the slot diaphragm and rotate the slot diaphragm from the basic position.
- Mark the distance and angle of rotation of the displayed slot diaphragm position on the monitor.



- Switch fluoroscopy on briefly.

The actual position (distance of the plates and angle of rotation) of the slot diaphragm is visible.

- The previously displayed monitor display must match the position and angle of rotation of the actual slot diaphragm position.
- Completely open the slot diaphragm and rotate the slot diaphragm again.
- Mark the distance and angle of rotation of the displayed slot diaphragm position on the monitor.

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- Switch fluoroscopy on briefly.

The actual position (distance of the plates and angle of rotation) of the slot diaphragm is visible. The previously displayed monitor display must match the position and angle of rotation of the actual slot diaphragm position.

NOTE

Perform this check with the lowest possible kV values so that the front edges of the slot diaphragm plate are effectively visualized.

PMF Battery replacement in the UPS

The lead-acid battery installed in the UPS must be replaced preventively every 36 months.

The replacement procedure is described in the supplied installation instructions from the manufacturer as well as in Replacement of Parts Instructions SPR2-310.841.01.

5 Final result/quality inspection and maintenance

SIE IQ quick test

- Test the image quality according to the ARCADIS Varic image quality assurance test. Include additional monitors (if applicable).

PMP Maintenance

- Entire system: Improve damage to paint as possible.

5.1 Final work steps**SIE Ground wire test****SIE Ground wire resistance**

- Perform the ground wire test while the system is closed according to ARTD-002.731.17. The ground wire resistance may not exceed 0.2 ohms.